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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/161,196	09/25/1998	FRANK HINTERMAIER	GR-97-P-2734	7324

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EXAMINER

NGUYEN, CUONG QUANG

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 06/04/2002

25

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/161,196

Applicant(s)

HINTERMAIER, FRANK

Examiner

Cuong Q Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 2, 4, 6 and 13-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5, 7-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

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DETAILED ACTION

Claim Rejections - 35 U.S.C. § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Summerfelt et al. (US 5,566,045).

Regarding claims 1, 7, 8, 9, Summerfelt et al. discloses a capacitor structure in an integrated semiconductor device comprising: a semiconductor substrate (30); a first electrode (34, a platinum group materials. See Summerfelt et al.'s col.10) connected to a doped region (44), capacitor dielectric layer (38, a BST layer with a dielectric constant greater than 100. See Summerfelt et al.'s col.11) formed on the first electrode; a barrier layer (52, a GaAs layer. See Summerfelt et al.'s col.13) which is a compound of a transition element (Ga) and As formed below the capacitor dielectric layer; a second electrode formed on the capacitor dielectric layer. See Summerfelt et al.'s Fig.12.

Claims 1, 3-5, and 7-12 are rejected under 35 U.S.C. 102(a) as being anticipated by Kawakubo et al. (US 5,691,219).

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Regarding claims 1, 3, 7, 8, 9, 10, 11, Kawakubo et al. discloses a capacitor structure in an integrated semiconductor device comprising: a semiconductor substrate (1) having a doped region (6b) therein; a first electrode (13, a platinum alloy) connected to the doped region through a connection structure (11, a phosphorus-doped polysilicon layer. See Kawakubo et al.'s col.7 lines 39-43); a capacitor dielectric layer (14, a BST layer with a dielectric constant greater than 100. See Kawakubo et al.'s col.8 lines 5-8) formed on the first electrode; a barrier layer (12, a layer of transition metal such as Ti or Ta. See Kawakubo et al.'s col.7 lines 55-60) formed below the capacitor dielectric layer; a second electrode (14) formed on the capacitor dielectric layer. See Kawakubo et al.'s Fig.4E.

Kawakubo et al. does not explicitly teach that the barrier is a compound of a transition element and phosphorus as the barrier; however, this barrier layer is taken to be inherently present in Kawakubo et al. for the following reasons: the transition element layer (12, a layer of Ti or Ta) will react with phosphorus from the connection structure (11, a polysilicon layer containing phosphorous) inherently forming a barrier material such as a TiP or TaP. Noted that, US60115997 patent clearly teaches that 'certain Group VB nonmetal elements such as: N, P, As, and Sb, can react with titanium to form barrier materials (e.g., TiN, TiP, TiAs, and TiSb)' provides proof for Ti or Ta will react with phosphorus in polysilicon to form TiP or TaP barrier layer in Kawakubo et al. See US6011997's col.7 lines 50-60.

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Regarding claims 4-5, as shown in Fig.4E, the barrier layer is disposed directly underneath the first electrode, covers entire an interface between the first electrode and the connection structure and covers entire an interface between the first electrode and the capacitor dielectric.

Regarding claim 12, Kawakubo et al. teaches that the capacitor connected to a selection transistor through the doped region (6b). See Fig.4E.

Response to Arguments

2. Applicants argue that gallium is not a transitional element. In response, the evidence that Ga is a transition element was already provided to Applicant in the final office action filed on 11-06-00. US patents US705685, US5990348, US6043184, and US6060419, presented as the evidence, clearly teach that gallium is a transitional element.

Applicants argue that the concentration of phosphorous atoms used as a dopant for a plug is far too low to create a TiP barrier layer. In response, the arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); In re Geisler, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997) ("An assertion of what seems to follow from common experience is just attorney argument and not the kind of actual evidence that is required to rebut a prima facie case of obviousness."). See MPEP 716.01(c) for examoples of attorney

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statements which are not evidence and which must be supported by an appropriate affidavit or declaration.

Conclusion

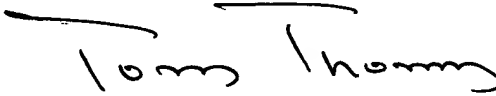
3. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

4. Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

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5. Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to CUONG Q NGUYEN whose telephone number is (703) 308-1293. The Examiner is in the Office generally between the hours of 6:30 AM to 5:00 PM (Eastern Standard Time) Monday through Thursday.
6. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center Receptionists whose telephone number is 308-0956.


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Cuong Nguyen

May 22, 2002